

H1875

0058424

Date: 28 October 2002  
To: Bechtel Hanford, Inc. (technical representative)  
From: TechLaw, Inc.  
Project: 100F Area - Full Protocol - Waste Site 1607-F2  
Subject: Radiochemistry - Data Package No. H1875-EB (SDG No. H1875)

## INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H1875-EB which was prepared by Eberline Services (EB). A list of samples validated along with the analyses reported and the requested analytes is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
J002X0	8/13/02	Soil	C	Gamma Spectroscopy
J002X1	8/13/02	Soil	C	Gamma Spectroscopy
J002X2	8/13/02	Soil	C	Gamma Spectroscopy
J002X3	8/13/02	Soil	C	Gamma Spectroscopy
J002X4	8/13/02	Soil	C	Gamma Spectroscopy
J002X5	8/13/02	Soil	C	Gamma Spectroscopy
J002X6	8/13/02	Soil	C	Gamma Spectroscopy
J002X7	8/13/02	Soil	C	Gamma Spectroscopy
J002X8	8/13/02	Soil	C	Gamma Spectroscopy
J002X9	8/13/02	Soil	C	Gamma Spectroscopy

Data validation was conducted in accordance with the Bechtel Hanford Incorporated (BHI) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL December 2001). Appendices 1 through 6 provide the following information as indicated below:

- Appendix 1. Glossary of Data Reporting Qualifiers
- Appendix 2. Summary of Data Qualification
- Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
- Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
- Appendix 5. Data Validation Supporting Documentation
- Appendix 6. Additional Data Requested by Client

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## **DATA QUALITY PARAMETERS**

- **Holding Times**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for radiochemical analysis is 6 months.

All holding times were acceptable.

- **Preparation (Method) Blanks**

### Laboratory Blanks

Blank samples are analyzed to determine if positive results are due to laboratory reagent, sample container, or detector contamination. If blank analysis results indicate the presence of an analyte above the minimum detectable activity (MDA), the following qualifiers are applied: All positive sample results less than five times the highest blank concentration are qualified as estimates and flagged "J"; sample results below the MDA are qualified as undetected and flagged "U"; sample results above the MDA and greater than five times the highest blank concentration are not qualified.

All blank results were acceptable.

### Field (Equipment) Blank

No equipment blanks were submitted for analysis.

- **Accuracy**

Accuracy is evaluated from laboratory control sample (LCS) or blank spike sample (BSS) batch samples and spiked samples from the analytical batch. Measured activities are compared to the known added amounts. The acceptable LCS or BSS and matrix spike (MS) recovery range is  $\pm 3$  sigma. Spike sample results outside the above ranges result in associated sample results being qualified as estimates, or not qualified, depending on the activity of the individual sample. Results are rejected for LCS/BSS recoveries of less than 30%.

All accuracy results were acceptable.

- **Laboratory Duplicates**

Analytical precision is expressed by the relative percent differences (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample in the analytical batch. Precision may alternatively be assessed using unspiked duplicate analyses performed on a sample in the analytical batch. If both sample and replicate activities (concentrations) are greater than five times the contract required detection limit (CRDL) and the RPD is less than 30%, no qualification is required. If either activity (concentration) is less than five times the CRDL, the RPD control limit is less than or equal to two times the CRDL. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

All duplicate results were acceptable.

**Field Duplicate**

One set of field duplicate samples were submitted for analysis (J002X0/J002X9). Field duplicate results are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

- **Detection Levels**

Reported analytical detection levels for undetected analytes are compared against the 100 Area Remedial Action Sampling and Analysis Plan target detection limits (TDLs) to ensure that laboratory detection levels meet the required criteria. Eighteen analytes were reported above their TDL. Under the BHI statement of work, no qualification is required. All other reported results met the analyte specific TDL.

- **Completeness**

Data package No. H1875 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

## **MAJOR DEFICIENCIES**

None found.

## **MINOR DEFICIENCIES**

Eighteen analytes were reported above their TDL. Under the BHI statement of work, no qualification is required.

## **REFERENCES**

BHI, MRB-SBB-A23665, *Validation Statement of Work*, Bechtel Hanford Incorporated, September 5, 1997.

DOE/RL-96-22, Rev. 3, *100 Area Remedial Action Sampling and Analysis Plan*, U.S. Department of Energy, December 2001.

**Appendix 1**  
**Glossary of Data Reporting Qualifiers**

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Qualifiers which may be applied by data validators in compliance with the BHI statement of work are as follows:

- U - Indicates the compound or analyte was analyzed for and not detected above the minimum detectable activity (MDA) in the sample. The value reported is the sample result corrected for sample dilution and moisture content by the laboratory. The data is usable for decision making purposes.
- UJ - Indicates the compound or analyte was analyzed for and not detected at concentrations above the minimum detectable activity (MDA) in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate, but is usable for decision making purposes.
- J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.
- R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

**Appendix 2**  
**Summary of Data Qualification**

**000007**

## DATA QUALIFICATION SUMMARY

SDG: H1875	REVIEWER: TLI	DATE: 10/28/02	PAGE <u>1</u> OF <u>1</u>
COMMENTS: No qualifiers assigned			

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**Appendix 3**

**Qualified Data Summary and Annotated Laboratory Reports**

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\* - TDL exceeded

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize potential miss-interpretation of results. All other qualifiers shown were applied during validation.

EBERLINE SERVICES / RICHMOND  
SAMPLE DELIVERY GROUP H1875

R208080-01

J002X0

DATA SHEET

SDG <u>7333</u> Contact <u>Melissa C. Mannion</u>	Client/Case no <u>Hanford</u> Contract No. <u>630</u>	SDG <u>H1875</u>
Lab sample id <u>R208080-01</u>	Client sample id <u>J002X0</u>	
Dept sample id <u>7333-001</u>	Location/Matrix <u>1607-F2 Shallow Zone</u>	<u>SOLID</u>
Received <u>08/15/02</u>	Collected/Weight <u>08/13/02 08:00</u>	<u>1690 g</u>
% solids <u>99.6</u>	Custody/SAF No <u>B00-030-067</u>	<u>B00-030</u>

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Potassium 40	13966-00-2	11.4	0.79	0.42			GAM
Cobalt 60	10198-40-0	U		0.041	0.050	U	GAM
Cesium 137	10045-97-3	U		0.036	0.10	U	GAM
Radium 226	13982-63-3	0.427	0.071	0.067	0.10		GAM
Radium 228	15262-20-1	0.570	0.18	0.17	0.20		GAM
Europium 152	14683-23-9	U		0.078	0.10	U	GAM
Europium 154	15585-10-1	U		0.14	0.10	U	GAM
Europium 155	14391-16-3	U		0.060	0.10	U	GAM
Thorium 228	14274-82-9	0.524	0.039	0.038			GAM
Thorium 232	TH-232	0.570	0.18	0.17			GAM
Uranium 235	15117-96-1	U		0.11		U	GAM
Uranium 238	U-238	U		4.7		U	GAM
Americium 241	14596-10-2	U		0.045		U	GAM

100 F Area - Full Protocol

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10/25/02

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Lab id <u>TMANC</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>09/05/02</u>

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SAMPLE DELIVERY GROUP H1875

R208080-02

J002X1

DATA SHEET

SDG <u>7333</u> Contact <u>Melissa C. Mannion</u>	Client/Case no <u>Hanford</u> Contract No. <u>630</u>	SDG <u>H1875</u>
Lab sample id <u>R208080-02</u> Dept sample id <u>7333-002</u> Received <u>08/15/02</u> % solids <u>99.5</u>	Client sample id <u>J002X1</u> Location/Matrix <u>1607-F2 Shallow Zone</u> Collected/Weight <u>08/13/02 08:11</u> <u>1678 g</u> Custody/SAF No <u>B00-030-067</u> <u>B00-030</u>	SOLID

ANALYTE	CAS NO	RESULT pCi/g	2 $\sigma$ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Potassium 40	13966-00-2	14.1	0.69	0.29			GAM
Cobalt 60	10198-40-0	U		0.033	0.050	U	GAM
Cesium 137	10045-97-3	U		0.031	0.10	U	GAM
Radium 226	13982-63-3	0.493	0.061	0.059	0.10		GAM
Radium 228	15262-20-1	0.669	0.14	0.14	0.20		GAM
Europium 152	14683-23-9	U		0.072	0.10	U	GAM
Europium 154	15585-10-1	U		0.10	0.10	U	GAM
Europium 155	14391-16-3	U		0.097	0.10	U	GAM
Thorium 228	14274-82-9	0.611	0.035	0.036			GAM
Thorium 232	TH-232	0.669	0.14	0.14			GAM
Uranium 235	15117-96-1	U		0.12		U	GAM
Uranium 238	U-238	U		4.0		U	GAM
Americium 241	14596-10-2	U		0.21		U	GAM

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Protocol <u>Hanford</u>
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Version <u>3.06</u>
Report date <u>09/05/02</u>

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SAMPLE DELIVERY GROUP H1875

R208080-03

J002X2

DATA SHEET

SDG <u>7333</u> Contact <u>Melissa C. Mannion</u>	Client/Case no <u>Hanford</u> Contract No. <u>630</u>	SDG <u>H1875</u>
Lab sample id <u>R208080-03</u>	Client sample id <u>J002X2</u>	
Dept sample id <u>7333-003</u>	Location/Matrix <u>1607-F2 Shallow Zone</u>	<u>SOLID</u>
Received <u>08/15/02</u>	Collected/Weight <u>08/13/02 08:20</u>	<u>1950 g</u>
% solids <u>99.7</u>	Custody/SAF No <u>B00-030-067</u>	<u>B00-030</u>

ANALYTE	CAS NO	RESULT pCi/g	2 $\sigma$ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Potassium 40	13966-00-2	15.5	0.95	0.26			GAM
Cobalt 60	10198-40-0	U		0.027	0.050	U	GAM
Cesium 137	10045-97-3	U		0.023	0.10	U	GAM
Radium 226	13982-63-3	0.478	0.053	0.045	0.10		GAM
Radium 228	15262-20-1	0.654	0.11	0.10	0.20		GAM
Europium 152	14683-23-9	U		0.054	0.10	U	GAM
Europium 154	15585-10-1	U		0.094	0.10	U	GAM
Europium 155	14391-16-3	U		0.062	0.10	U	GAM
Thorium 228	14274-82-9	0.724	0.046	0.041			GAM
Thorium 232	TH-232	0.654	0.11	0.10			GAM
Uranium 235	15117-96-1	U		0.080		U	GAM
Uranium 238	U-238	U		2.7		U	GAM
Americium 241	14596-10-2	U		0.032		U	GAM

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Report date <u>09/05/02</u>

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SAMPLE DELIVERY GROUP H1875

R208080-04

J002X3

DATA SHEET

SDG 7333  
Contact Melissa C. Mannion

Client/Case no Hanford  
Contract No. 630

SDG H1875

Lab sample id R208080-04  
Dept sample id 7333-004  
Received 08/15/02  
% solids 99.4

Client sample id J002X3  
Location/Matrix 1607-F2 Shallow Zone SOLID  
Collected/Weight 08/13/02 08:26 1683 g  
Custody/SAF No B00-030-067 B00-030

ANALYTE	CAS NO	RESULT pCi/g	2 $\sigma$ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Potassium 40	13966-00-2	14.8	0.56	0.26			GAM
Cobalt 60	10198-40-0	U		0.032	0.050	U	GAM
Cesium 137	10045-97-3	0.163	0.032	0.031	0.10		GAM
Radium 226	13982-63-3	0.442	0.061	0.056	0.10		GAM
Radium 228	15262-20-1	0.610	0.15	0.14	0.20		GAM
Europium 152	14683-23-9	0.559	0.053	0.059	0.10		GAM
Europium 154	15585-10-1	U		0.10	0.10	U	GAM
Europium 155	14391-16-3	U		0.075	0.10	U	GAM
Thorium 228	14274-82-9	0.583	0.046	0.050			GAM
Thorium 232	TH-232	0.610	0.15	0.14			GAM
Uranium 235	15117-96-1	U		0.11		U	GAM
Uranium 238	U-238	U		3.7		U	GAM
Americium 241	14596-10-2	U		0.091		U	GAM

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Lab id <u>TMANC</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>09/05/02</u>

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SAMPLE DELIVERY GROUP H1875

R208080-05

J002X4

DATA SHEET

SDG <u>7333</u>	Client/Case no <u>Hanford</u>	SDG <u>H1875</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R208080-05</u>	Client sample id <u>J002X4</u>	
Dept sample id <u>7333-005</u>	Location/Matrix <u>1607-F2 Shallow Zone</u>	<u>SOLID</u>
Received <u>08/15/02</u>	Collected/Weight <u>08/13/02 08:31</u>	<u>1736 g</u>
% solids <u>99.4</u>	Custody/SAF No <u>B00-030-067</u>	<u>B00-030</u>

ANALYTE	CAS NO	RESULT pCi/g	2 $\sigma$ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Potassium 40	13966-00-2	14.6	0.74	0.32			GAM
Cobalt 60	10198-40-0	U		<u>0.057</u>	0.050	U	GAM
Cesium 137	10045-97-3	0.254	0.043	0.045	0.10		GAM
Radium 226	13982-63-3	0.518	0.069	0.070	0.10		GAM
Radium 228	15262-20-1	0.891	0.15	0.14	0.20		GAM
Europium 152	14683-23-9	0.490	0.064	0.078	0.10		GAM
Europium 154	15585-10-1	U		<u>0.13</u>	0.10	U	GAM
Europium 155	14391-16-3	U		<u>0.11</u>	0.10	U	GAM
Thorium 228	14274-82-9	0.662	0.038	0.040			GAM
Thorium 232	TH-232	0.891	0.15	0.14			GAM
Uranium 235	15117-96-1	U		0.14		U	GAM
Uranium 238	U-238	U		4.8		U	GAM
Americium 241	14596-10-2	U		0.25		U	GAM

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Lab id <u>TMANC</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>09/05/02</u>

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EBERLINE SERVICES / RICHMOND  
SAMPLE DELIVERY GROUP H1875

R208080-06

J002X5

DATA SHEET

SDG 7333	Client/Case no Hanford	SDG H1875
Contact Melissa C. Mannion	Contract No. 630	
Lab sample id R208080-06	Client sample id J002X5	
Dept sample id 7333-006	Location/Matrix 1607-F2 Shallow Zone	SOLID
Received 08/15/02	Collected/Weight 08/13/02 08:37	1743 g
% solids 99.7	Custody/SAF No B00-030-067	B00-030

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Potassium 40	13966-00-2	14.7	0.94	0.42			GAM
Cobalt 60	10198-40-0	U		0.048	0.050	U	GAM
Cesium 137	10045-97-3	0.065	0.043	0.054	0.10	J	GAM
Radium 226	13982-63-3	0.432	0.076	0.077	0.10		GAM
Radium 228	15262-20-1	0.800	0.20	0.20	0.20		GAM
Europium 152	14683-23-9	0.199	0.081	0.11	0.10		GAM
Europium 154	15585-10-1	U		0.16	0.10	U	GAM
Europium 155	14391-16-3	U		0.11	0.10	U	GAM
Thorium 228	14274-82-9	0.559	0.044	0.046			GAM
Thorium 232	TH-232	0.800	0.20	0.20			GAM
Uranium 235	15117-96-1	U		0.17		U	GAM
Uranium 238	U-238	U		5.5		U	GAM
Americium 241	14596-10-2	U		0.15		U	GAM

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Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 09/05/02

EBERLINE SERVICES / RICHMOND  
SAMPLE DELIVERY GROUP H1875

R208080-07

J002X6

DATA SHEET

SDG 7333	Client/Case no Hanford	SDG H1875
Contact Melissa C. Mannion	Contract No. 630	
Lab sample id R208080-07	Client sample id J002X6	
Dept sample id 7333-007	Location/Matrix 1607-F2 Shallow Zone	SOLID
Received 08/15/02	Collected/Weight 08/13/02 08:43	1750 g
% solids 99.7	Custody/SAF No B00-030-067	B00-030

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Potassium 40	13966-00-2	16.2	0.96	0.23			GAM
Cobalt 60	10198-40-0	U		0.037	0.050	U	GAM
Cesium 137	10045-97-3	0.131	0.030	0.034	0.10		GAM
Radium 226	13982-63-3	0.429	0.048	0.045	0.10		GAM
Radium 228	15262-20-1	0.664	0.13	0.12	0.20		GAM
Europium 152	14683-23-9	0.224	0.043	0.057	0.10		GAM
Europium 154	15585-10-1	U		0.096	0.10	U	GAM
Europium 155	14391-16-3	U		0.054	0.10	U	GAM
Thorium 228	14274-82-9	0.722	0.053	0.051			GAM
Thorium 232	TH-232	0.664	0.13	0.12			GAM
Uranium 235	15117-96-1	U		0.085		U	GAM
Uranium 238	U-238	U		3.0		U	GAM
Americium 241	14596-10-2	U		0.035		U	GAM

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Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 09/05/02

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EBERLINE SERVICES / RICHMOND  
SAMPLE DELIVERY GROUP H1875

R208080-08

J002X7

DATA SHEET

SDG 7333	Client/Case no Hanford	SDG H1875
Contact Melissa C. Mannion	Contract No. 630	
Lab sample id R208080-08	Client sample id J002X7	
Dept sample id 7333-008	Location/Matrix 1607-F2 Shallow Zone	SOLID
Received 08/15/02	Collected/Weight 08/13/02 08:47	1795 g
% solids 99.7	Custody/SAF No B00-030-067	B00-030

ANALYTE	CAS NO	RESULT pCi/g	2 $\sigma$ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Potassium 40	13966-00-2	14.2	0.86	0.41			GAM
Cobalt 60	10198-40-0	U		0.045	0.050	U	GAM
Cesium 137	10045-97-3	0.211	0.042	0.045	0.10		GAM
Radium 226	13982-63-3	0.430	0.082	0.079	0.10		GAM
Radium 228	15262-20-1	0.690	0.19	0.20	0.20		GAM
Europium 152	14683-23-9	U		0.11	0.10	U	GAM
Europium 154	15585-10-1	U		0.14	0.10	U	GAM
Europium 155	14391-16-3	U		0.097	0.10	U	GAM
Thorium 228	14274-82-9	0.558	0.039	0.040			GAM
Thorium 232	TH-232	0.690	0.19	0.20			GAM
Uranium 235	15117-96-1	U		0.15		U	GAM
Uranium 238	U-238	U		5.0		U	GAM
Americium 241	14596-10-2	U		0.13		U	GAM

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Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 09/05/02

EBERLINE SERVICES / RICHMOND  
SAMPLE DELIVERY GROUP H1875

R208080-09

J002X8

DATA SHEET

SDG 7333 Contact <u>Melissa C. Mannion</u>	Client/Case no <u>Hanford</u> Contract No. <u>630</u>	SDG H1875
Lab sample id <u>R208080-09</u>	Client sample id <u>J002X8</u>	
Dept sample id <u>7333-009</u>	Location/Matrix <u>1607-F2 Shallow Zone</u>	<u>SOLID</u>
Received <u>08/15/02</u>	Collected/Weight <u>08/13/02 07:45</u>	<u>1511 g</u>
% solids <u>100.0</u>	Custody/SAF No <u>B00-030-067</u>	<u>B00-030</u>

ANALYTE	CAS NO	RESULT pCi/g	2 $\sigma$ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Potassium 40	13966-00-2	5.90	0.85	0.12			GAM
Cobalt 60	10198-40-0	U		0.011	0.050	U	GAM
Cesium 137	10045-97-3	U		0.010	0.10	U	GAM
Radium 226	13982-63-3	0.154	0.024	0.020	0.10		GAM
Radium 228	15262-20-1	0.193	0.065	0.052	0.20	J	GAM
Europium 152	14683-23-9	U		0.025	0.10	U	GAM
Europium 154	15585-10-1	U		0.036	0.10	U	GAM
Europium 155	14391-16-3	U		0.036	0.10	U	GAM
Thorium 228	14274-82-9	0.179	0.017	0.012			GAM
Thorium 232	TH-232	0.193	0.065	0.052			GAM
Uranium 235	15117-96-1	U		0.040		U	GAM
Uranium 238	U-238	U		1.3		U	GAM
Americium 241	14596-10-2	U		0.014		U	GAM

100 F Area - Full Protocol

*per  
10/28/02*

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000019

Lab id <u>TMANC</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>09/05/02</u>

E B E R L I N E   S E R V I C E S / R I C H M O N D  
S A M P L E D E L I V E R Y G R O U P H1875

R208080-10

J002X9

D A T A   S H E E T

SDG <u>7333</u> Contact <u>Melissa C. Mannion</u>	Client/Case no <u>Hanford</u> Contract No. <u>630</u>	SDG <u>H1875</u>
Lab sample id <u>R208080-10</u>	Client sample id <u>J002X9</u>	
Dept sample id <u>7333-010</u>	Location/Matrix <u>1607-F2 Shallow Zone</u>	<u>SOLID</u>
Received <u>08/15/02</u>	Collected/Weight <u>08/13/02 08:00</u>	<u>1645 g</u>
% solids <u>99.5</u>	Custody/SAF No <u>B00-030-067</u>	<u>B00-030</u>

ANALYTE	CAS NO	RESULT pCi/g	2 $\sigma$ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Potassium 40	13966-00-2	12.6	0.63	0.28			GAM
Cobalt 60	10198-40-0	U		0.031	0.050	U	GAM
Cesium 137	10045-97-3	U		0.030	0.10	U	GAM
Radium 226	13982-63-3	0.413	0.062	0.062	0.10		GAM
Radium 228	15262-20-1	0.711	0.15	0.14	0.20		GAM
Europium 152	14683-23-9	U		0.071	0.10	U	GAM
Europium 154	15585-10-1	U		0.099	0.10	U	GAM
Europium 155	14391-16-3	U		0.092	0.10	U	GAM
Thorium 228	14274-82-9	0.561	0.034	0.033			GAM
Thorium 232	TH-232	0.711	0.15	0.14			GAM
Uranium 235	15117-96-1	U		0.13		U	GAM
Uranium 238	U-238	U		3.9		U	GAM
Americium 241	14596-10-2	U		0.23		U	GAM

100 F Area - Full Protocol

*PC*  
*10/28/02*

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000020

Lab id <u>TMANC</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>09/05/02</u>

**Appendix 4**

**Laboratory Narrative and Chain-of-Custody Documentation**

**000021**

**Eberline Services**  
W.O. No. R2-08-080-7333

**Bechtel Hanford Inc.**  
**SDG H1875**

**Case Narrative**

**Page 1 of 1**

**1.0 GENERAL**

Bechtel Hanford Inc. (BHI) Sample Delivery Group H1875 was composed of ten solid (soil) samples designated under SAF No. B00-030 with a Project Designation of: 100 F Area – Full Protocol.

The samples were received as stated on the Chain-of-Custody documents. Any discrepancies are noted on the Eberline Services Sample Receipt Checklist. The results were transmitted to BHI via e-Fax on September 5, 2002.

**2.0 ANALYSIS NOTES**

**2.1 Gamma Spectroscopy Analyses**

No problems were encountered during the course of the analyses.

**Case Narrative Certification Statement**

"I certify that this data package is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data obtained in this hard copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature."

Melissa Mannion  
Melissa C. Mannion  
Program Manager

9/10/02  
Date

000022

Bechtel Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				B00-030-067	Page 1 of 2
Collector M.T. Stankovich		Company Contact Mike Stankovich	Telephone No. 531-7620	Project Coordinator TRENT, SJ		Price Code 8L	Data Turnaround
Project Designation 100 F Area - Full Protocol		Sampling Location 1607-F2 Shallow Zone	H1875 (7333)	SAF No. B00-030		Air Quality <input type="checkbox"/> 21 Days	
Ice Chest No. <i>EBC-01-030</i>		Field Logbook No. EI-1535-6	COA R607F22000	Method of Shipment Fed Ex			
Shipped To <i>CMA/RCRA</i>		Offsite Property No. <i>A# 20239</i>			Bill of Lading/Air Bill No. <i>7900 2163 7129</i>		
POSSIBLE SAMPLE HAZARDS/REMARKS Radioactive <i>Tie to T000T1</i> Special Handling and/or Storage <i>Note</i>				Preservation	Note		
				Type of Container	P		
				No. of Container(s)	1		
				Volume	1000mL		
SAMPLE ANALYSIS				Set item (1) in Special Instructions.			
Sample No.	Matrix *	Sample Date	Sample Time				
J002X0	SOIL	8-13-02	0800				
J002X1	SOIL	8-13-02	0811				
J002X2	SOIL	8-13-02	0820				
J002X3	SOIL	8-13-02	0826				
J002X4	SOIL	8-13-02	0831				
CHAIN OF POSSESSION				Sign/Print Name		SPECIAL INSTRUCTIONS	
Relinquished By/Removed From <i>M.T. Stankovich</i>	Date/Time 1500 <i>8/13/02</i>	Received By/Stored In <i>30/3728 8-13-02 1500</i>	Date/Time			(1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155)	
Relinquished By/Removed From <i>Raf S B 3728</i>	Date/Time 0900 <i>8-14-02</i>	Received By/Stored In <i>R. f. h. R. f. h. 8-14-02</i>	Date/Time 0900 <i>8-14-02</i>			Personnel not available to relinquish samples from the 3728 Ref # 3 B on 8/14/02	
Relinquished By/Removed From <i>Raf E</i>	Date/Time 0900 <i>8-14-02</i>	Received By/Stored In <i>Fed Ex</i>	Date/Time				
Relinquished By/Removed From <i>Fed E</i>	Date/Time 0900 <i>8-15-02</i>	Received By/Stored In <i>Fed Ex 8-15-02 10:15am</i>	Date/Time				
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time				
LABORATORY SECTION	Received By	Title				Date/Time	
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By				Date/Time	

P=Soil  
 S=Surface  
 G=Ground  
 S+Sludge  
 W=Water  
 O=Oil  
 A=Air  
 D=Dry/Semi-Solids  
 DL=Dry Liquid  
 T=Tissue  
 W=Wipe  
 L=Liquid  
 V=Vegetation  
 X=Other

Bechtel Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				B00-030-067	Page 2 of 2
Collector M.T. Stankovich		Company Contact Mike Stankovich	Telephone No. 531-7620	Project Coordinator TRENT, SJ		Price Code 8L	Data Turnaround 21 Days
Project Designation 100 F Area - Full Protocol		Sampling Location 1607-F2 Shallow Zone	H1875 (7333)	SAF No. B00-030			
Ice Chest No. ERC 01-030		Field Logbook No. EI-1535-6	COA R607F22000	Method of Shipment Fed Ex			
Shipped To (TMA/RECRA)		Offsite Property No. R020239			Bill of Lading/Air Bill No. 79002163 7179		
POSSIBLE SAMPLE HAZARDS/REMARKS <i>Radioactive Tie to J0009T1</i>		Preservation	None				
Special Handling and/or Storage <i>Note</i>		Type of Container	P				
		No. of Container(s)	1				
		Volume	1000mL				
SAMPLE ANALYSIS				See Item (1) in Special Instructions.			
Sample No.	Matrix *	Sample Date	Sample Time				
J002X5	SOIL	8-13-02	0837	—			
J002X6	SOIL	8-13-02	0843	—			
J002X7	SOIL	8-13-02	0847	—			
J002X8	SOIL	8-13-02	0745	—			
J002X9	SOIL	8-13-02	0800	—			
CHAIN OF POSSESSION				Sign/Print Name			
Relinquished By/Removed From <i>M.T. Stankovich</i>	Date/Time 8-13-02	Received By/Stored In <i>36/3728</i>	Date/Time 8-13-02 /500	SPECIAL INSTRUCTIONS			
Relinquished By/Removed From <i>Raf 3-13 3728 8-14-02</i>	Date/Time 8-14-02	Received By/Stored In <i>R. fohlbauer</i>	Date/Time 8-14-02	(1) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155) Personnel not available to relinquish samples from the 3728 Ref # 3B on 8-14-02			
Relinquished By/Removed From <i>ERC R. fohlbauer 8-14-02</i>	Date/Time 8-14-02	Received By/Stored In <i>Fed Ex</i>	Date/Time				
Relinquished By/Removed From <i>Fed Ex 8-15-02</i>	Date/Time 8-15-02	Received By/Stored In <i>and sons</i>	Date/Time 8-15-02 /0-15AM				
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time				
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time				
LABORATORY SECTION	Received By	Title			Date/Time		
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By			Date/Time		

**Appendix 5**

**Data Validation Supporting Documentation**

**000025**

## APPENDIX A

### RADIOCHEMICAL DATA VALIDATION CHECKLIST

#### RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT:	J00 F	1607-F2	DATA PACKAGE:	H1875	
VALIDATOR:	TLI	LAB: EB	DATE:	10/25/02	
CASE:			SDG:	H1875	
ANALYSES PERFORMED					
Gross Alpha/Beta	Strontium-90	Technetium-99	Alpha Spectroscopy	Gamma Spectroscopy	
Total Uranium	Radium-22	Tritium			
SAMPLES/MATRIX J002F2					
J002X0 J002X1 J002X3 J002X4, J002X5					
J002X6 J002X7 J002X8 J002X9					

1. Completeness .....  N/A

Technical verification forms present? .....  Yes No N/A

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2. Initial Calibration (Levels D, E) .....  N/A

Instruments/detectors calibrated? .....  Yes No N/A

Initial calibration acceptable? .....  Yes No N/A

Standards NIST traceable? .....  Yes No N/A

**Appendix A – Radiochemical Data Validation Checklist**

Standards Expired? ..... Yes No N/A

Calculation check acceptable? ..... Yes No N/A

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_3. Continuing Calibration (Levels D, E) .....  N/A

Calibration checked within required frequency? ..... Yes No N/A

Calibration check acceptable? ..... Yes No N/A

Calibration check standards traceable? ..... Yes No N/A

Calibration check standards expired? ..... Yes No N/A

Calculation check acceptable? ..... Yes No N/A

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_4. Background Counts (Levels D, E) .....  N/A

Background Counts checked within required frequency? ..... Yes No N/A

Background Counts acceptable? ..... Yes No N/A

Calculation check acceptable? ..... Yes No N/A

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Appendix A – Radiochemical Data Validation Checklist**

**5. Blanks (Levels B, C, D, E) .....**  N/A

Method blank analyzed within required frequency? .....  Yes  No  N/A

Method blank results acceptable? .....  Yes  No  N/A

Analytes detected in method blank? .....  Yes  No  N/A

Field blank(s) analyzed? .....  Yes  No  N/A

Field blank results acceptable? .....  Yes  No  N/A

Analytes detected in field blank(s)? .....  Yes  No  N/A

Transcription/Calculation Errors? (Levels D, E) .....  Yes  No  N/A

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**6. Laboratory Control Samples or Blank Spike Samples (Levels C, D, E) .....**  N/A

LCS /BSS analyzed within required frequency? .....  Yes  No  N/A

LCS/BSS recoveries acceptable? .....  Yes  No  N/A

LCS/BSS traceable? (Levels D,E) .....  Yes  No  N/A

LCS/BSS expired? (Levels D,E) .....  Yes  No  N/A

LCS/BSS levels correct? (Levels D,E) .....  Yes  No  N/A

Transcription/Calculation Errors? (Levels D, E) .....  Yes  No  N/A

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**7. Chemical Carrier Recovery (Levels C, D, E) .....**  N/A

Chemical carrier added? .....  Yes  No  N/A

Chemical recovery acceptable? .....  Yes  No  N/A

Chemical carrier traceable? (Levels D, E ) .....  Yes  No  N/A

**Appendix A – Radiochemical Data Validation Checklist**

Chemical carrier expired? (Levels D, E) ..... Yes No N/A

Transcription/Calculation errors? (Levels D, E) ..... Yes No N/A

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_8. Tracer Recovery (Levels C, D, E) .....  N/A

Tracer added? ..... Yes No N/A

Tracer recovery acceptable? ..... Yes No N/A

Tracer traceable? (Levels D, E) ..... Yes No N/A

Tracer expired? (Levels D, E) ..... Yes No N/A

Transcription/Calculation errors? (Levels D, E) ..... Yes No N/A

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_9. Matrix Spikes (Levels C, D, E) .....  N/A

Matrix spike analyzed? ..... Yes No N/A

Spike recoveries acceptable? ..... Yes No N/A

Spike source traceable? (Levels D, E) ..... Yes No N/A

Spike source expired? (Levels D, E) ..... Yes No N/A

Transcription/Calculation Errors? (Levels D, E) ..... Yes No N/A

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Appendix A – Radiochemical Data Validation Checklist**10. Duplicates (Levels C, D, E) .....  N/ADuplicates Analyzed at required frequency? .....  Yes  No  N/ARPD Values Acceptable? .....  Yes  No  N/ATranscription/Calculation Errors? (Levels D, E) .....  Yes  No  N/AComments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_11. Field QC Samples (Levels C, D E) .....  N/AField duplicate sample(s) analyzed? .....  Yes  No  N/AField duplicate RPD values acceptable? .....  Yes  No  N/AField split sample(s) analyzed? .....  Yes  No  N/AField split RPD values acceptable? .....  Yes  No  N/APerformance audit sample(s) analyzed? .....  Yes  No  N/APerformance audit sample results acceptable? .....  Yes  No  N/AComments: XO/X9  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

12. Holding Times (All levels)

Are sample holding times acceptable? .....  Yes  No  N/AComments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Appendix A – Radiochemical Data Validation Checklist**13. Results and Detection Limits (All Levels).....  N/AResults reported for all required sample analyses? .....  Yes  No  N/AResults supported in raw data? (Levels D, E) .....  Yes  No  N/AResults Acceptable? (Levels D, E) .....  Yes  No  N/ATranscription/Calculation errors? (Levels D, E) .....  Yes  No  N/AMDA's meet required detection limits? .....  Yes  No  N/ATranscription/calculation errors? (Levels D, E) .....  Yes  No  N/AComments: say eighteen over

**Appendix 6**  
**Additional Documentation Requested by Client**

**000032**

E B E R L I N E S E R V I C E S / R I C H M O N D  
S A M P L E D E L I V E R Y G R O U P H1875

R208080-12

Method Blank

M E T H O D   B L A N K

SDG <u>7333</u>	Client/Case no <u>Hanford</u>	SDG <u>H1875</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R208080-12</u>	Client sample id <u>Method Blank</u>	
Dept sample id <u>7333-012</u>	Material/Matrix	<u>SOLID</u>
	SAF No <u>B00-030</u>	

ANALYTE	CAS NO	RESULT pCi/g	2 $\sigma$ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Potassium 40	13966-00-2	U		0.21		U	GAM
Cobalt 60	10198-40-0	U		0.012	0.050	U	GAM
Cesium 137	10045-97-3	U		0.011	0.10	U	GAM
Radium 226	13982-63-3	U		0.020	0.10	U	GAM
Radium 228	15262-20-1	U		0.045	0.20	U	GAM
Europium 152	14683-23-9	U		0.025	0.10	U	GAM
Europium 154	15585-10-1	U		0.034	0.10	U	GAM
Europium 155	14391-16-3	U		0.032	0.10	U	GAM
Thorium 228	14274-82-9	U		0.013		U	GAM
Thorium 232	TH-232	U		0.045		U	GAM
Uranium 235	15117-96-1	U		0.045		U	GAM
Uranium 238	U-238	U		1.2		U	GAM
Americium 241	14596-10-2	U		0.079		U	GAM

100 F Area - Full Protocol

QC-BLANK 42567

METHOD BLANKS  
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Lab id <u>TMANC</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>09/05/02</u>

000033

**EBERLINE SERVICES/RICHMOND**  
SAMPLE DELIVERY GROUP H1875

R208080-11

Lab Control Sample

**LAB CONTROL SAMPLE**

SDG 7333	Client/Case no Hanford	SDG H1875
Contact <u>Melissa C. Mannion</u>	Case no No. 630	
Lab sample id R208080-11	Client sample id Lab Control Sample	
Dept sample id 7333-011	Material/Matrix	SOLID
	SAF No 800-030	

ANALYTE	RESULT	2 $\sigma$ ERR	MDA	RDL	QUALI-	TEST	ADDED	2 $\sigma$ ERR	REC	3 $\sigma$ LMTS	PROTOCOL
	pCi/g	(COUNT)	pCi/g	pCi/g	FTERS		pCi/g	pCi/g	%	(TOTAL)	LIMITS
Cobalt 60	0.938	0.035	0.015	0.050		GAM	0.988	0.040	95	77-123	80-120
Cesium 137	1.26	0.035	0.020	0.10		GAM	1.24	0.050	102	76-124	80-120

100 F Area - Full Protocol

QC-LCS 42566

LAB CONTROL SAMPLES

Page 1

SUMMARY DATA SECTION

Page 9

Lab id <u>TMANC</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-LCS</u>
Version <u>3.06</u>
Report date <u>09/05/02</u>

000034

**EBERLINE SERVICES/RICHMOND**  
SAMPLE DELIVERY GROUP H1875

R208080-13

J002X5

**DUPLICATE**

SDG <u>7333</u>	Client/Case no <u>Hanford</u>	SDG <u>H1875</u>
Contact <u>Melissa C. Mannion</u>	Case no <u>No. 630</u>	
<b>DUPLICATE</b>		
Lab sample id <u>R208080-13</u>	Lab sample id <u>R208080-06</u>	Client sample id <u>J002X5</u>
Dept sample id <u>7333-013</u>	Dept sample id <u>7333-006</u>	Location/Matrix <u>1607-F2 Shallow Zone</u> <u>SOLID</u>
% solids <u>99.7</u>	Received <u>08/15/02</u>	Collected/Weight <u>08/13/02 08:37</u> <u>1743 g</u>
	% solids <u>99.7</u>	Custody/SAF No <u>B00-030-067</u> <u>B00-030</u>

ANALYTE	DUPLICATE	2 $\sigma$ ERR	MDA	RDL	QUALI-	TEST	ORIGINAL	2 $\sigma$ ERR	MDA	QUALI-	RPD	3 $\sigma$ PROT
	pCi/g	(COUNT)	pCi/g	pCi/g	FIERS		pCi/g	(COUNT)	pCi/g	FIERS	%	TOT LIMIT
Potassium 40	14.8	0.57	0.25		GAM	GAM	14.7	0.94	0.42		1	34
Cobalt 60	U		0.030	0.050	U	GAM	U		0.048	U	-	-
Cesium 137	0.086	0.031	0.031	0.10	J	GAM	0.065	0.043	0.054	J	28	110
Radium 226	0.398	0.047	0.045	0.10		GAM	0.432	0.076	0.077		8	45
Radium 228	0.594	0.14	0.13	0.20		GAM	0.800	0.20	0.20		30	62
Europium 152	0.224	0.049	0.060	0.10		GAM	0.199	0.081	0.11		12	74
Europium 154	U		0.11	0.10	U	GAM	U		0.16	U	-	-
Europium 155	U		0.070	0.10	U	GAM	U		0.11	U	-	-
Thorium 228	0.630	0.040	0.043			GAM	0.559	0.044	0.046		12	35
Thorium 232	0.594	0.14	0.13			GAM	0.800	0.20	0.20		30	62
Uranium 235	U		0.11		U	GAM	U		0.17	U	-	-
Uranium 238	U		3.6		U	GAM	U		5.5	U	-	-
Americium 241	U		0.089		U	GAM	U		0.15	U	-	-

100 F Area - Full Protocol

QC-DUP#6 42568

DUPLICATES  
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**000035**

Lab id <u>INANC</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DUP</u>
Version <u>3.06</u>
Report date <u>09/05/02</u>

# Review Comment Record (RCR)

1. Date 10/29/02	2. Review No. BHI/QA2016
3. Project 100F Area	4. Page Page 1 of 1

5. Document Number(s)/Title(s)  SDG No.: H1875	6. Program/Project/ Building Number  100F Area Full Protocol – Waste Sites 1607-F2	7. Reviewer  Claude Stacey	8. Organization/Group  BHI/QA	9. Location/Phone  H0-16/372-9208
--	--	----------------------------------	-------------------------------------	---

17. Comment Submittal Approval:                    10. Agreement with indicated comment disposition(s)                    11. CLOSED

Organization Manager (Optional)		Reviewer/Point of Contact		Reviewer/Point of Contact	
		Date			Date
		Author/Originator		Author/Originator	
12. Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/resolve the discrepancy/problem indicated.)	14. Hold Point	15. Disposition (Provide justification if NOT accepted.)		16. Status
1	Radiochemistry: OK, No Comments				
2					
3	.				
4					
5					
6					